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10/735,406	12/12/2003	Robert Indech	23050-RA	2092

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EXAMINER

BEHREND, HARVEY E

ART UNIT	PAPER NUMBER
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3641

DATE MAILED: 07/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/735,406

Applicant(s)

INDECH, ROBERT

Examiner

Harvey E. Behrend

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-95 is/are pending in the application.
- 4a) Of the above claim(s) 11, 12, 13, 88, 90 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 13, 14, 89, 91-95 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

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1. There is lack of unity under PCT Rule 13 for the below listed Groups, because there is no "special technical feature" common to all of the inventions which defines the contribution which each of the inventions makes over the prior art. In the present case there is no such common special technical feature because the claims such as claims 1, 29, 43, 73 do not define over PCT publication WO 90/14669 and claims such as claims 1, 15, 43, 58 do not define over the showings of dendrites, whiskers, asperities or protuberances of the cathodes in Sawatimova et al (Trans. of Fusion Technology, vol. 26, Dec. 1994, pp 389-394).

Group I. Fusion apparatus with a protrusion and deuterium (claims 1-10, 14, 89, 91-95).

Group II. Fusion apparatus with a protrusion and tritium (claims 1-9, 11, 14, 89, 91-95).

Group III. Fusion apparatus with a protrusion and with deuterium and tritium (claims 1-9, 12, 14, 89, 91-95).

Group IV. Fusion apparatus with protrusion and ions of elements having higher atomic numbers than isotopic hydrogen (claims 1-9, 13, 14, 89, 91-95).

Group V. Fusion apparatus with cone and deuterium (claims 15-24, 28, 89, 91, 92).

Group VI. Fusion apparatus with cone and tritium (claims 15-23, 25, 28, 89, 91, 92).

Group VII. Fusion apparatus with cone and with deuterium and tritium (claims 15-23, 26, 28, 89, 91, 92).

Group VIII. Fusion apparatus with cone and ions of elements having higher atomic numbers than isotopic hydrogen (claims 15-23, 27, 28, 89, 91, 92).

Group IX. Fusion apparatus with wedge and deuterium (claims 29-38, 42, 89, 91, 92).

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Group X. Fusion apparatus with wedge and tritium (claims 29-37, 39, 42, 89, 91, 92).

Group XI. Fusion apparatus with wedge and with deuterium and tritium (claims 29-37, 40, 42, 89, 91, 92).

Group XII. Fusion apparatus with wedge and ions of elements having higher atomic numbers than isotopic hydrogen (claims 29-37, 41, 42, 89, 91, 92).

Group XIII. Fusion method with protrusion and deuterium (claims 43-52, 56, 57, 88, 90).

Group XIV. Fusion method with protrusion and tritium (claims 43-51, 53, 56, 57, 88, 90).

Group XV. Fusion method with protrusion and with deuterium and tritium (claims 43-51, 54, 56, 57, 88, 90).

Group XVI. Fusion method with protrusion and ions of elements having higher atomic numbers than isotopic hydrogen (claims 43-51, 55-57, 88, 90).

Group XVII. Fusion method with cone and deuterium (claims 58-67, 71, 72, 88, 90).

Group XVIII. Fusion method with cone and tritium (claims 58-66, 68, 71, 72, 88, 90).

Group XIX. Fusion method with cone and with deuterium and tritium (claims 58-66, 69, 71, 72, 88, 90).

Group XX. Fusion method with cone and ions of elements having higher atomic numbers than isotopic hydrogen (claims 58-66, 70-72, 88, 90).

Group XXI. Fusion method with wedge and deuterium (claims 73-82, 86-88, 90).

Group XXII. Fusion method with wedge and tritium (claims 73-81, 83, 86-88, 90).

Group XXIII. Fusion method with wedge and with deuterium and tritium (claims 73-81, 84, 86-88, 90).

Group XXIV. Fusion method with wedge and ions of elements having higher atomic numbers than isotopic hydrogen (claims 73-81, 85-88, 90).

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2. In a telephone interview with applicants attorney, Mr. Joel Meyers on 2/15/05, an election without traverse was made of the invention of Group IV (claims 1-9, 13, 14, 89, 91-95).

An action on the merits of claims 1-10, 13, 14, 89, 91-95 is included herein.

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of an electron source, a protrusion constructed as an ultra-thin membrane on a heat exchanger, a structure which comprises a net charge density, a means for introducing electrons proximate the surface, a nuclei fuel source, an electrically neutral plane, a reaction fuel, an electrical potential difference, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining

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figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. The specification is objected to under 35 U.S.C. § 112, first paragraph, as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention i.e. failing to provide an enabling disclosure.

There is no reputable evidence of record to support any allegations or claims that the invention involves nuclear fusion nor, that any allegations or claims of "excess heat" and of transmutation, are valid and reproducible, nor that the invention as disclosed is capable of operating as indicated and capable of providing a useful output.

The invention (see for example pages 7+ of the specification) is considered as being based on the "cold fusion" concept set forth by Fleischmann and Pons (hereinafter, F and P)(see the 3/24/89 article by D. Braaten). This

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concept relies on the incorporation of deuterium into a metal lattice. While F and P relied on electrolysis of heavy water to incorporate deuterium into the metal lattice, it was also known that as a variation, the deuterium could be incorporated into the metal lattice by bringing the metal into contact with deuterium gas.

Applicant utilizes a concept of electron screening with cone-shaped or wedge-shaped structures on a surface to facilitate room temperature fusion reactions (specification page 12).

Thus it is clear that applicants invention is no more than variation of the cold fusion concept set forth by F and P.

However, as set forth more fully below, this "cold fusion" concept is still no more than just an unproven concept or theory. Indeed, even applicant in his specification on pages 7 and 8 for example, admit that there are no successful, reproducible, cold fusion systems.

Subsequent to the announcement of the cold fusion concept by F and P, many laboratories have attempted to confirm the results of F and P.

The results of these attempts at confirmation were primarily negative and even of the few initial positive results, these were generally either retracted or shown to be in error by subsequent experimenters (see for example, the article by Stipp in the Wall Street Journal and the article by Browne in The New York Times (particularly page A22)).

The general consensus by those skilled in the art and working at these various laboratories is that the assertions by F and P were based on

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experimental errors (e.g. see The New York Times article by Browne, Kreysa et al, Lewis et al, Hilts, Ohashi et al, Miskelly et al, and Chapline).

It was also the general consensus by those skilled in the art and working at these various laboratories that there is no reputable evidence to support the allegation or claim of excess heat production, nor, is there any reputable evidence of neutron, gamma ray, tritium, helium production, etc., to support the allegations or claims that nuclear reactions are taking place. See for example, (in addition to the above listed references), Cooke, Alber et al, Faller et al, Cribier et al, Hajdas et al, Shani et al, Ziegler et al, Price et al, Schrieder et al and page A3 of the 3/29/90 edition of The Washington Post (which refers to the negative findings of a physicist who had tested Pon's own cold fusion apparatus, for nuclear output (for a more complete analysis of said "negative findings", note the article by Salamon et al)). Also of interest in this respect is the Cooke reference which on pages 4 and 5 refers to the attempts at Harwell to obtain "cold fusion" and that Fleischmann (of F and P) had requested help from Harwell in verifying the cold fusion claims. Said page 5 also indicates that data was collected in Frascatti-type (i.e. gaseous) experiments.

The last paragraph on said page 5 states:

"After three months of around-the-clock work at a cost of over a half a million dollars, the project was terminated on June 15. This program is believed to be one of the most comprehensive worldwide with as many as 30 cells operating at a time and over 100 different experiments performed. The final result of this monumental effort in the words of the official press release was, "In none of these experiments was there any evidence of fusion taking place under electrochemical conditions. It should also be added that there was no evidence of excess heat generated by any of their cells".



This disclosure is insufficient and non-enabling as to how and in what manner, the invention can be carried out so as to provide an operative embodiment wherein electron screening or shielding of the positively charged fusible nuclei occurs near the tips of each cone or wedge-shaped structure such that nuclear fusion at room temperature will actually take place as indicated and, that a self-sustaining fusion reaction process will take place.

Applicants specification itself contains assumptions and speculation as to how and in what manner, his invention will be operative (e.g. see pages 17+). However, applicant has presented no reputable factual evidence to support his assumptions and speculation concerning a reproducible, sustainable cold fusion or excess enthalpy reaction. Applicants theory appears contrary to accepted theory. Without reputable evidence to the contrary, the accepted theory is presumed correct. The disclosure is insufficient in failing to set forth the underlying assumptions for applicants theory and, equations on pages 19-26, as well as applicants appraisal of the degree of validity of said assumptions.

In further regard to said equations, it is noted that if one makes enough assumptions, practically anything can be "proven" mathematically.

Further, the equations contain "undetermined" coefficients and constants (e.g. see page 19 line 22 and page 21 line 20).

The disclosure is insufficient in failing to show, how and in what manner, said "undetermined" coefficients and constants can actually be determined, for the various types and structures of the cold fusion systems in question.

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Clearly, one can get different results based on the selection of said “undetermined” coefficients and constants.

In this same regard, the specification on pages 21, 22 refers to a “matrix” equation (4) but is insufficient in failing to disclose how and in what manner said matrix equation (4) was derived.

In regard to said matrix equation (4), the specification on page 22 states:

“Implicit within this model is the assumption of equivalence of fusion probability with equivalence of total electron ionization value.”

The disclosure is insufficient as to the basis for said “assumption of equivalence” as well as applicants appraisal of the degree of validity of said assumption.

Applicants cold fusion theory or concept requires electron screening of the positively charged fusible nuclei and a high electron charge density at the tip of the protuberance (also known in the art as a dendrite, whisker or asperite).

Such however, is contrary to presently accepted theories and scientific facts.

In this respect, Fukai shows that deuterium nuclei in a palladium lattice cannot come close enough to each other to undergo nuclear fusion and, that the electrons do not provide an effective screening.

Lindley also debunks the theory of electron screening, stating on page 376 of Nature, vol. 344:

“But a little learning is a dangerous thing. Electrons in a metal obtain their effective masses because they are not bound to a single atomic site, but move in concert throughout the lattice: push against one, and you push against them all. But if one of these lattice electrons is detached from the

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system so it can bind two deuterons into a molecule, it is no longer part of the electron collective, and reverts to having its normal mass. In other words, the effective mass of an electron in a solid depends on what you are doing to it, and if you want it to bind an isolated molecule, it can no longer have a high effective mass.”

Likewise, Chechin et al in Inter. J. of Theoretical Physics provide a critical review of numerous theoretical cold fusion models, showing why these cold fusion models are not valid. Note particularly the comments on Fractoacceleration, Fractoacceleration plasma and, Interface Acceleration on pages 653-657. The Interface Acceleration concept refers to the allegations of enhanced fields at the tips of whiskers or dendrites growing on electrolytic cathodes (such is directly applicable against applicants concept). Note the “critique” and the references to the “sporadic” character and “poor reproducibility” on page 657.

The disclosure is insufficient as to how and in what manner, the structures illustrated in Figs. 1 and 3 with their ordered and aligned arrays of identical cones or ridges and identical spacings, etc., can actually be operatively made or manufactured. The disclosure is insufficient as to how and in what manner it can be ensured that the tip of cone 20 is made of a single atom (page 26 of the specification).

The mere reference to “suitable” “nanotechnology” processing techniques as on pages 31 and 36 of the specification, is insufficient in identifying any actual nanotechnology technique which is actually capable of producing said ordered and aligned arrays of identical cones or ridges (as illustrated in applicants Figs. 1 and 3).

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Applicants specification on pages 35, 36 also states, his sharply-pointed geometry can be obtained by the growth of dendrites in conventional electroplating apparatus. However, the disclosure is insufficient as to how and in what manner, such would form suitable micro-peaks which would enable nuclear fusion to take place, as well as to the electroplating parameters, necessary to cause the formation of said "suitable micro-peaks", as well as the sizes of said micro-peaks.

In this respect, it is noted that systems such as Gullett, Oswin et al, Kuo et al, Wicke et al or Andrus (II), each show the formation of protuberances or dendrites on the electrodes in electrolytic systems wherein the electrodes are connected to a power supply, this inherently providing a source of electrons. However, none of these references disclose that nuclear fusion is taking place, even though there will be present at the dendrite tips, hydrogen isotopes or other nuclei (applicants specification on pages 32, 33 for example, states that such dendrites will enable nuclear fusion of nuclei with atomic numbers higher than that of isotopic hydrogen).

Assuming for the sake of argument that applicants invention actually is able to produce nuclear fusion at the dendrite tips, in contrast to the above noted systems of any of Gullett, Oswin et al, Kuo et al, Wicke et al or Andrus (II), it can only be because of some undisclosed, additional critical feature(s) not found in any of the above noted systems.

Applicants disclosure is hence insufficient and non-enabling in failing to disclose and identify, said additional, critical feature(s) necessary to cause the

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production of nuclear fusion, in contrast to the above noted systems of any of Gullett, Oswin et al, Kuo et al, Wicke et al or Andrus (II).

The disclosure is insufficient as to what causes pre-loading of the cones before a potential is applied (specification page 29 lines 1-8) (the disclosure is also insufficient as to exactly what, the potential is applied across).

The disclosure is insufficient as to exactly what would constitute a suitable "electron source", the requisite parameters of this suitable electron source and, its position with respect to the cones or ridges, and as to how and in what manner it provides a supply of electrons to the tips of the cones or ridges (page 29 of specification).

The disclosure is insufficient as to how and in what manner, two deuterium nuclei are caused to be positioned at the tip of the cone, as indicated in the sentence bridging pages 29, 30 of the specification.

The disclosure is insufficient as to exactly how and in what manner, the burst rate can be controlled by any of the manners set forth at the bottom of page 31 of the specification (the broad statements set forth therein appear to be mere conjecture).

The disclosure is insufficient as to how and in what manner, the cones (or ridges) can be constructed on an "ultra-thin membrane" on a heat exchanger as set forth on page 32 of the specification. The disclosure is also insufficient and non-enabling as to what attaches the membrane to the heat exchanger and, as to what all is meant by and is encompassed by the term "ultra-thin" (e.g. its thickness).

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The disclosure is insufficient and non-enabling as to what all is meant by and is encompassed by, the term “electrically neutral plane” (e.g. see page 36 of the specification).

The specification on pages 32, 33 speculates on the use of applicants cold fusion concept using cones or ridges, for causing nuclear fusion of nuclei with higher atomic numbers than that of isotopic hydrogen, but, provides no basis whatsoever for said speculation and, is hence insufficient and non-enabling.

Applicants disclosure is insufficient and non-enabling in failing to disclose the type of system in which the nuclear fusion is to take place (e.g. gaseous, electrolytic, etc.), the means for providing a supply of fusible nuclei to the cones or ridges (and its positional relationship thereto), etc., necessary to provide an operative embodiment.

There is also no adequate description nor enabling disclosure of the dimensions of the cones or ridges and of the spacings therebetween, the applied currents and voltages, the parameters of the electron source, the exact composition (including impurities and amounts thereof) of the material for forming the cones or ridges and reacting surface, the exact composition (including impurities and amounts thereof) of the material comprising the fusible nuclei, etc.

Note that such parameters are critical in arriving at an operative cold fusion embodiment. For example, Morrison (VI) (Cold Fusion Update No. 8) shows the electrode spacing to be an important parameter. Page 3 thereof, shows that if the electrodes are close enough to each other, one can get recombination of hydrogen isotopes and oxygen (which can be misinterpreted as

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excess heat). Jones et al (I), Murray (III), Wilson et al, Lewis et al, Shelton et al, Shanahan (IV) are examples of documents showing the critical importance of proper instrument calibration and calorimetry analysis. Miles (C&EN, July 13, 1998 on pp 10, 11), Carr, Green et al (particularly the second column on page 101), Williams et al, are examples showing the critical important of cell component composition and impurity content and of electrode pretreatment.

Note that in cold fusion systems (which is what applicants invention is), the scientific community in general do not consider any alleged positive results as valid (as even indicated by applicant on pages 7 and 8 of the specification) because the alleged positive results do not fall with the limits of experimental error or are not a result of a misinterpretation of experimental results. Note in this respect, that the examiner has cited several documents that deal with calorimeter problems and other sources of error in cold fusion systems.

There are numerous external influences that can effect the measurement of any produced heat. Note for example, the analysis of calorimetric evidence for electrochemical induced cold fusion in MisKelly et al, Albagli et al, Lewis et al, and Ohashi et al.

Murray (VIII) refers to some of the problems with the use of isoperbolic calorimeters and indicates that such calorimeters appear to be unreliable for measuring excess heat in cells in which the electrode surfaces are changing.

Buehler et al note some of the problems and errors that can occur in calorimetry and, outline some criteria for establishing calorimeter performance for more definitive measurement of excess heat.

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The Nov. 1989 Report of the ERAB to the DOE on pages 44+ sets forth some of the experimental problems in the evaluation of heat effects in cold fusion systems and, states that there was a lack of predictability and reproducibility (page 36).

The DOE Dec. 1, 2004 "Report of the Review of Low Energy Nuclear Reactions" under the heading "Charge Element 1" refers to some of the problems with excess heat measurements in cold fusion systems and indicates that most of the reviewers considered any positive excess heat results as not repeatable or reproducible.

As to this issue of reproducibility, note the following comments by Huizenga (IV) under the heading Reproducibility:

"The foundation of science requires experimental results to be reproducible. Validation is an integral part of the scientific process. Scientists are obligated to write articles in ways that allow observations to be replicated. Instructions should be available to permit a competent and well-equipped scientist to perform the experiment and obtain essentially the same results. Replication in science usually is reserved for experiments of special importance or experiments that conflict with an accepted body of work. The greater the implication of an experimental result, the more quickly it will be checked by other scientists.

As more and more groups at major universities and national laboratories were unable to replicate either the claimed excess heat or fusion products, proponents of cold fusion quickly pointed out that the experiment was not done properly: one needed different size palladium cathodes, longer electrolysis times, and higher currents, they claimed.

Whenever the inability of qualified scientists to repeat an experiment is met by ad hoc excuses, beware. One important role of a scientific article is to provide directions for others. Scientists establish priorities for their discoveries by publishing a clear and well documented recipe of their experimental procedures. If a scientific article fails to include an adequate recipe which allows a skilled reader to reproduce the experiment, it is a warning that the author's understanding of their work is incomplete.



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Cold-fusion proponents introduced new dimensions into the subject of reproducibility in science. Some tried to turn the table on reproducibility by giving irreproducibility a degree of respectability. A second aberration was to assign a different value to experiments attempting replication. Only experiments that obtained some fragmentary evidence for cold fusion were to be taken seriously because it was declared that experiments obtaining negative results required no special skills or expertise. This viewpoint led proponents of cold fusion to invite mainly papers reporting positive results when organizing conferences. Such an aberrant procedure is incompatible with the scientific process and usually is viewed negatively by scientists as well as journalists." (Underlining added).

Note that "reproducibility" must go beyond one's own lab. One must produce a set of instructions, a recipe, that would enable anyone in their own independent lab (including the labs of cold fusion skeptics), to produce the same results. If reproducibility only occurs in one's own lab, errors (such as systematic errors) would be suspect. See for example, Little et al.

As a further issue in regard to reproducibility, experimenters who previously found evidence of excess heat, found no evidence of excess heat when better calorimeter equipment was used (see section 2.2 on page 2 of Morrison (IV) (note that such refers to the work at IMRA (Japan))).

Reproducibility of the alleged positive cold fusion results is clearly a critical feature in determining if a disclosure adequately teaches the artisan how to make and use an invention for its disclosed purpose.

Accordingly, the logical conclusion when one does not get identical results and/or the results are not reproducible at will in these cold fusion experiments, is that the alleged positive results are not real but instead, they are due to experimental errors, instrumentation errors, misinterpretation of results, etc.

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Clearly, when an artisan or experimenter is relying on the experimental results of a particular experiment(s) to establish certain facts, it is incumbent upon the experimenter to show that the alleged experimental results are valid and not just the result of experimental error (and that the alleged experimental results do not fall within the limits of experimental errors).

This is especially so when the experiments in question are (as here) in a field wherein the scientific community in general considers the alleged positive experimental results to be erroneous.

It is considered elementary that identical structures operated in identical manners, must produce identical results. Such is even relied on in one's everyday life.

If instrumentation, etc., indicates that identical structures operated in identical manners do not produce identical results, clearly, one of two things is implied:

1) The presumed identical structures actually are not identical, i.e. one of said structures actually has something additional, some critical feature not found in the other said structure, which causes said one of said structures to produce the positive results.

2) The structures actually are identical, however, instrumentation, etc. is producing spurious results leading to the erroneous conclusion that one or even some of said identical structures, are producing positive results.

If however, it is actually something additional, some critical feature, which causes some of these cold fusion systems to produce actual, positive results

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whereas otherwise identical systems do not, then clearly, this something "additional", this critical feature, must be clearly specified so as to enable the artisan to make and use the invention as required by statute.

The specification on page 33 refers to nuclear transmutation as taking place.

Such however is considered mere speculation since Murray (IV) (particularly pages 5 and 6) show how ICP-MS data can be misinterpreted as providing evidence of nuclear transmutations or transformation. Note also in this respect, the negative comments concerning nuclear transmutations in cold fusion cells, on pages 7 and 8 of Morrison (IV).

Note the statements (reproduced below) concerning nuclear transmutation on page 1 of Segment 2 of Bass.

"Scott's second epistle recapitulates what we learned from realms of data from Miley's and the Cincinnati Group's transmutation data. No reasonable evidence for transmutation exists once allowance is made for the innumerable ways complicated and subtle instrumentation can be wrong. You see, we can't even determine with those remarkable systems something as simple as 10 ppm Zn in pure  $\text{Li}_2\text{SO}_4$ . Prejudiced and desperate attempts to quickly survey complex unknown samples results in "data stew". (Underlining added).

Note also that page 2 of Segment I of Bass indicates that errors can easily occur in ICP/MS when working on unknown and/or unusual samples. Said page 2 states that different labs using samples split from the same reagent grade  $\text{Li}_2\text{SO}_4$  came up with differing amounts of Zn as being present in the  $\text{Li}_2\text{SO}_4$ . See the fifth paragraph on page 2 which states:

"The Aldrich analysis showed 4 ppm Zn. The old lab got 9 ppm Zn. The new lab got 51 ppm Zn. I told the new lab what the other two results

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were and asked them to repeat their analysis, they managed to come up with 31 ppm Zn the second time”.

For additional negative comments on the alleged transmutation of isotopes in a cold fusion cell, note Jones et al (IV) states on page 146 that radioisotope contaminants can be present in the electrolyte, electrodes or other components and; note also pages 152-156, 237, 269, 275, 276, 284, 286 of Huizenga (I). Said pages 152-156 indicate that some experimenters at the Naval Research Laboratory had mistakenly reported the production of particular palladium isotopes by neutron transmutation in cold fusion cells using a technique known as SIMS (secondary ion mass spectroscopy). Said pages 153 to 156 set forth reasons for this misinterpretation of experimental data. Note said page 156 which states:

“The story associated with the palladium isotope anomaly is not nearly so interesting because it is was simply due to an erroneous interpretation of data where the experimental mass peaks were misidentified. Contributions from polyatomic species of impurities with masses nearly coincident with those of the palladium isotopes caused the misidentification.

In spite of the fact that the palladium isotope anomalies had been discredited for over five months, Bockris submitted a paper on March 26, 1990 [Fusion Technology 1811 (1990)] in which he discussed, along with other cold fusion phenomena, the thermal and 14-MeV-neutron-induced cross sections on palladium isotopes. He used these mistaken isotopic anomalies data to suggest that the cold fusion reaction is a surface or near-surface reaction, and, therefore, to serve as supporting evidence for his model of fusion. Among cold fusion enthusiasts mistakes and erroneous results usually decay with a very long lifetime”. (Underlining added).

As set forth above, when an artisan or experimenter is relying on the experimental results of particular experiments to establish certain facts, it is incumbent upon the experimenter to show that the alleged experimental results are valid and note just the result of experimental errors or misinterpretation of

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experimental results (and that the alleged experimental results do not fall within the limits of experimental errors).

There is thus no reputable evidence of record to support the assumption and speculation that useful amounts of excess heat, tritium, and other nuclear reaction products, etc., would be produced with applicants invention.

Also, there is thus no reputable evidence of record to support the assumption and speculation that the invention would actually operate as indicated.

Note further, that there are cold fusion experimenters (especially those who believe in cold fusion) who consider that it is specific impurities and the level of these impurities, that cause some Pd metals to produce or catalyze nuclear fusion while other Pd metals (even some from the same supplier and batch) do not cause nuclear fusion to take place.

Note for example, Murray (I) on page 1 quoting Edmund Storms that "...only certain samples out of the same batch of catalyst work. Presumably if the He concentration were uniform, all samples would show He production. On the other hand, failure to initiate a nuclear reaction could result from failure to remove all impurities from the surface in the failed runs. This purification process is known to be important and tricky."

See also the following statement by M. Miles on page 10 of the 7/13/98 issue of C & EN:

"The cold fusion controversy will continue until an experiment is so clearly defined that it can be readily reproduced in any laboratory. My results, along with the reports from many other laboratories, suggest that there are hidden variables within the palladium metal that are not yet under experimental control. These variables include the grain size and impurity levels...." (Underlining added).

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For further documents illustrating this problem of finding an appropriate or suitable Pd material, note Murray (III) and Carr.

The examiner has cited documents showing how easily, experimental data, experimental errors, etc., can be misinterpreted as providing evidence of the operability of such cold fusion systems. The scientific community in general does not consider such cold fusion systems real, valid or operative.

In this respect that there has essentially been a continuing stream of publications from 1989 on showing that virtually none of the scientific community consider the alleged positive results of these "cold fusion" experiments, as being confirmed. In this respect, attention is directed to Merriman et al, Ewing et al, Albagli et al, Bosch et al, Fleming et al, Balke et al, Henderson et al, Nova, Huizenga (I), Huizenga (II), Huizenga (III), Huizenga (IV), and Rogers et al.

These references provide further clear evidence that no excess heat is generated in such "cold fusion" systems nor is there any evidence of nuclear reactions or transformations taking place.

As to some of the Japanese claims of positive cold fusion results, note the comments by David Williams in the Hadfield article on page 10 of the 10/31/92 issue of New Scientist. David Williams (head of the department of chemistry at University College London) described the claims as "absolutely pie-in-the-sky".

Note also the negative comments in Huizenga (I) as to some of the positive claims in Japanese work in cold fusion (e.g. see pages 240, 246, 251, 252, 277-281).

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Williams et al, Broad and NOVA refer to some of the spurious effects, faulty data, etc., which have led to some of the claims of the existence of cold fusion.

Clark et al (IV) show that metals can become contaminated with tritium from the atmosphere, that the amounts of absorbed tritium can be higher if the metals were close to releases of tritium by industry or by thermonuclear testing and, that such an lead to erroneous cold fusion results.

The Dagani article in the 1/14/91 issue of C & EN states that the "cold fusion" claims are taken seriously by virtually none of the scientific community and that research at Utah's National Fusion Institute (NCFI) as well as research elsewhere, have failed to establish the existence of cold fusion.

Another article by Dagani (in the 6/14/93 issue of C & EN) entitled "Latest Cold Fusion Results Fail to Win over Skeptics", states that "the vast majority of scientists...dismissed the evidence of nuclear fusion results inside a metal lattice as nonsense-a case study in pathological science".

Note particularly the excerpts from the book "Too Hot To Handle" by Frank Close. This book refers to various errors in the work of F and P (e.g. see pages 161+), as well as by other experimenters (note particularly the comments on excess heat in calorimetry on pages 351-353).

In this same vein, note the analysis of calorimetry with electrolytic cells of the F and P type, set forth in Wilson et al, as well as the comments concerning possible errors in heat measurement by Jones (on pages 284, 285 of Surface and Coatings Technology) and, by Albagli et al.

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Hilts states that the MIT experiments failed to produce any of the excess heat reported by the Utah group.

Lewis et al state in the summary on page 525 that they found no evidence of excess enthalpy in their experiments and, they refer to various possible sources of error which could lead to the erroneous conclusion that excess heat was produced (note pages 528-530).

Hilts, Lewis et al and the DOE Dec. 1, 2004 "Report of the Review of Low Energy Nuclear Reactions", indicate that in any determination of excess heat, one must determine the total amount of energy produced (as heat and chemical energy) integrated over the whole period of cell operation, versus the total energy input.

Another document showing how experimental data, etc., can be misinterpreted as providing evidence of the operability of cold fusion systems, is the transcript of the television show on NOVA entitled, "Confusion in a Jar", which indicated that in these cold fusion experiments, it is fairly easy to get quick results which could be "interpreted" as providing evidence of "cold fusion" but that in very carefully run experiments which were rechecked, etc., such as by using several different methods and/or detectors to attempt to detect the same presumed experimental results, the end result was negative.

The article by Taubes on pages 1299-1304 of the 6/15/90 issue of Science, explains why the alleged detection of tritium at Texas A & M cannot be relied on as evidence of "cold fusion" actually taking place.



Note that evidence shows that even having a high concentration of deuterium in the cathode will not result in nuclear fusion taking place.

In this respect, Silvera et al found no evidence of "cold fusion" with a D/Pd ratio as high as 1.34 and Myers et al obtained negative results even with a D/Pd ratio as high as 1.6.

Dagani in the June 5, 1995 issue of C & EN refers to experimental errors which negate the positive results of some cold fusion experimenters.

In a 1992 article in Surface and Coatings Technology, Jones takes the position that the claims of excess heat, tritium and helium production due to nuclear reactions are "dubious to say the least" (note page 288) because there is no evidence of commensurate nuclear products. Note the reference to  $E=mc^2$  on page 286.

Taubes, "Bad Science: The Short Life and Weird Times of Cold Fusion", 1993, is a good reference for showing the view point of the scientific majority towards cold fusion. After interviewing over 250 people in the field, Taubes concluded that "Cold Fusion... does not exist", and "As long as financial support could be found, the research would continue... In fact, the few researchers still working in the field would have little incentive to acknowledge negative results as valid, because such recognition would only cut off their funds". Note page 426.

Another good reference presenting a compilation and analysis of cold fusion work subsequent to the 1989 announcement of the cold fusion claims of F and P, is the book, "Cold Fusion: The Scientific Fiasco of the Century", by Huizenga (I). Huizenga was co-chairman of the Nov. 1989 DOE/ERAB panel on

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cold fusion. Note particularly the “Epilogue” on pages 237-287 which discusses some of the alleged positive results presented at the First, Second and Third Conferences on Cold Fusion.

On pages 201+ (and more particularly, page 214) Huizenga (I) indicates cold fusion can qualify or be characterized as “pathological science”, defined as “the science of things that aren’t so” (see also Huizenga (II), Huizenga (IV), Morrison (II), and Rousseau in this respect).

On page 206, Huizenga (I) states that some of the similarities between cold fusion and other unsubstantiated concepts, are

- (1) lack of control experiments,
- (2) statistical uncertainties,
- (3) irreproducibility and
- (4) the public description as a “simple experiment”.

Note particularly pages 125, 222, 223, of Huizenga (I) which refer to the lack of reproducibility of the alleged “positive” cold fusion results.

Clearly, if something cannot be reproduced at will, there is also, then, no enabling disclosure which would enable one of ordinary skill in the art, to make and use it, as required by statute (35 USC 112).

Morrison (I) in Trans. of Fusion Technology, sets forth various criteria to be followed in doing cold fusion experiments and of problems that can arise.

Jones et al (II) and Jones et al (I) debunk the positive cold fusion claims of Miles et al at the Naval Research Lab in China Lake, showing how experimental errors, etc., can give a false impression of positive results.

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Jones et al (III) and Shkedi et al show how faradaic efficiencies of less than 100% during electrolysis of water can account for alleged reports of excess heat in "cold fusion" cells.

For a good discussion of errors arising in cold fusion tests or experiments, note for example, the book, "Too Hot To Handle", by Frank Close. Pages 259-263 of this book set forth various errors that can occur, leading to the erroneous conclusion that excess power was produced in the cold fusion experiments.

Page 261 of this book contains the telling statement:

"In addition to these experimental problems there were several examples where the numerical evaluation of the data and assessment of error were incorrectly or badly done or, in some cases, not done at all...

The DOE panel commented that there had been a noticeable lack of attention to the statistical assessment of errors, and that in some cases, where heat was being claimed, a group's claim of excess heat is not supported with results of sufficient precision to allow such a conclusion. More usually it is not possible to assess precision from reported results because the result is reported from a single run and no error bars are provided for the measured parameters....

The DOE panel noted: 'Conclusions in this area simply cannot be accepted without a thorough assessment of the measurement errors. In its visits and conversations the members of the panel were struck repeatedly by the absence of critical assessments of this kind.'" (Underlining added).

In this respect, Morrison (III), Jones et al (I), Murray (II), Murray (VI), Jones et al (II), Jones et al (III), Green et al, Shelton et al, and Merriman et al, discuss some of the possible sources of errors (including systematic errors) in the calorimetry that can lead to the erroneous conclusion that excess heat was present. As indicated above, Buehler et al set forth criteria useful for establishing calorimeter performance for measurements of excess heat. Murray (VII) lists several questions to be addressed in cold fusion calorimetry so as to provide

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more accurate results. Murray (VI) states subtle systematic errors cannot be found by analyzing the final report of an experiment, since by that time any inconsistencies that might have pointed to such an error have been smoothed over and cultivated out of the data and the only way to find such errors is to immerse yourself in the laboratory with the working experiment and just go over everything countless times.

As to further documents illustrating errors that can occur and/or have not been accounted for in cold fusion experiments, see J.E. Jones, Giglio, Shanahan (II), Shanahan (III), Schultz (II), Blue (I), Carr, Hoffman, Shkedi et al, Shelton et al, Jones et al (III).

It is the examiners' position that an undue amount of experimentation would be required to produce an operative embodiment of applicants invention. The examiner has cited numerous documents showing that experimenters have obtained negative results using various types of cold fusion apparatus, all based on the cold fusion concept set forth by F and P. These documents show how easily experimental results can be misinterpreted as evidence of cold nuclear fusion.

This issue of undue experimentation has been succinctly addressed by Douglass Morrison at the Fourth International Conference on Cold Fusion Technology, (ICCF-4) held Dec. 6-9, 1993 in Hawaii (reproduced in Transactions of Fusion Technology vol. 26, Dec. 1994), see page 54 which states:

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8 December 1993; the previous speaker, Dr. H. Fox, giving he said, a businessman's point of view, declared he expected a working Cold Fusion device in 20 years.

November 1993. Dr. S. Pons said that by the year 2000 there should be a household power plant -6 years.

1992. Dr. M. Fleischmann said a 10 to 20 Kilowatt power plant should be operational in one year.

July 1989, The Desert News published an article by JoAnn Jacobsen-Wells who interviewed Dr. S. Pons. There is photograph in color, of Dr. Pons beside a simple apparatus with two tubes, one for cold water in and one for hot water out. This working unit based on Cold Fusion was described as "It couldn't take care of the family's electrical needs, but it certainly could provide them with hot water year-round" said Pons".

Later in the article it was written "Simply put, in its current state, it could provide boiling water for a cup of tea."

Time delay to this working model – Zero years.

Thus it appears that as time passes, the delay to realization of a working model increases.

#### X. CONCLUSION

No conclusions are presented – everyone can judge for themselves. However some questions can be asked;

Are Cold Fusion results consistent in claiming Cold Fusion effects in Deuterium but not in normal Hydrogen, while other groups claim Cold Fusion effects with hydrogen?

Is the ratio of tritium to neutron production about unity as Fleischmann and Pons originally claimed [5] or is the ratio in the wide range  $10^4$  -  $10^9$  as most other workers claim?

Are transmutation, Black Holes, Biology [18] part of the normal world of Cold Fusion?

To explain the null experiments there is one theory – the conventional theory of Quantum Mechanics, but there are a wide variety of theories to explain positive Cold Fusion results – can they all be valid simultaneously – if not, which should be rejected?" (Underlining added).

Morrison (V) provides a good report on the 5<sup>th</sup> Cold Fusion Conference and Morrison (IV) (discussed above) provides a good report on the Sixth Cold Fusion Conference.

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Note also the negative comments concerning "cold fusion" in Hoffman.

See particularly page x of the Foreward in Hoffman wherein Dr. T. R. Schneider of EPRI states:

"Where do these various efforts stand today? In my personal opinion, the overall finding is negative; that is, no verifiable evidence exists for nuclear effects consistent with the claimed "excess heat" measurements. Indeed the lack of any significant measurements of nuclear products suggests that the proponents' interpretation of the anomalous heat as real, yet unexplainable by any chemical, electrical, or mechanical source and hence by implication a nuclear phenomenon seems to me to be, at best, an extremely naive interpretation and reflects a very poor understanding of modern scientific method. The alternative explanation, that the anomalous heat measurements are not from nuclear reactions but are the result of an unidentified error or artifact, appears to me to be the only viable explanation of the "excess heat."  
... "Frequently, when the experiment has been improved to avoid possible artifacts, the measured quantity is reduced in intensity or even disappears".

For a good overall analysis of the status of Cold Fusion/Low Energy Nuclear Transmutations (CF/LENT), attention is directed to the MEMO (dated 10/9/97) from Bennett Miller to Dr. Robert W. Bass.

The Miller Memo indicates Dr. Bass had requested the Department of Energy to do a new, full-scale review of the Cold Fusion/Low Energy Nuclear Transmutations (CF/LENT) phenomena because of what Dr. Bass considered to be "emerging evidence of progress".

The Miller Memo indicates DOE's response was to commission Mr. Miller to do the review.

Page 3 of the Miller Memo indicates the vast amount of documents, etc., reviewed and considered by Miller in arriving at his conclusions.

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Basically, the conclusion of the Miller Memo is that there is still no concrete evidence of excess heat, nuclear transmutations, etc. Note particularly the following excerpts from the Miller Memo:

"The core problem that I have with CF/LENT is the disconnect between the public pronouncements of its proponents regarding the imminent commercial availability (nay, already established commercial availability if I am to believe the press clippings) of such systems and the somewhat more private and negative developments that seem to emerge at every turn.

Most prominent, but still only three among many such examples of the former, are first, the Cincinnati Group's recent representations regarding a revolutionary approach to the nuclear waste remediation problem – representations that you openly endorsed as revealed truth; second CETI's equally bold guarantee of a CF cell that put out aneutronic, excess heat on a reliable, predictable basis. And, third, your vouching to me, some time ago, for the imminent commercial installation operation of a CF power system in a hotel/resort complex that is currently under construction.

Moreover, the casual reader, picking up an issue of Infinite Energy, for example, would be hard pressed not to conclude that CF/LENT is a closed matter as far as demonstrating scientific feasibility is concerned. Around the world, governments and industries are successfully demonstrating the phenomena of excess heat, at the very least. If so, no further development, let alone research, is needed or desired. What possible role should or could your government's federal research and development community play when its charter is to support primarily that work that the private sector cannot or will not do on its own?

At the same time of course, more careful attention to what is going on suggests that not all is what it seems to be. The CG approach to nuclear transmutation is at best mired in controversy of the most basic sort. There is no verification of initial claims. There is no explanation of the basic process. A recent attempt to verify the process by a third party in one of DOE's national laboratories, was, in everyone's opinion, a failure; though it can be argued that the tests were inconclusive for a number of reasons. The CETI cell has similar problems. The hotel project with the 500 kw CF power plant, about which you were so enthusiastic, has been delayed indefinitely. And, the Japanese have terminated their three-year million dollar effort to demonstrate and commercialize cold fusion.

Perhaps this evidence that all is not well can be explained by sloppy science, or just complicated science, or financial difficulties unrelated to science, or by government mismanagement, or by pressure to move in different directions, though in the case of Japan that is hard to

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believe. Your assertion that the Japanese government has applied pressure internally to disband the effort flies in the face of all logic.

If any nation accords energy matters a higher priority than the Japanese, I do not know of it. If cold fusion is real, demonstrable, and reproducible it would mean more to the Japanese than any other industrialized nation. It would be a harbinger of the ultimate energy security that they have been seeking for the past 70 years—a security of energy supply that was one, if not the most, important determinant of their willingness to go to war in 1941. What possible motive could be to disbanding an effort that advocates of CF/LENT expected to succeed, except that perhaps it was not?

In fact it is my current understanding that the NHE program was disbanded precisely because it could not meet its primary objective of a concrete demonstration of excess heat, even after three years of work and an expenditure of over \$30 million. There have been claims made that the efforts was poorly managed -- that emphasis was incorrectly given to building a precommercial infrastructure at the expense of doing the science that needed to be done. If so, that is truly a sad state of affairs. But if it is true, I believe it will be corrected in fairly short order if for no other reason than that the stakes are so large. Nonetheless, the effort by a major industrial nation to amount a successful, ministry-sponsored, CF program cannot be characterized as anything other than a failure at this point.

This line of inquiry bring us back to the fundamental dilemma. If CF/LENT is as real as some of the scientific results presented at respected scientific meetings (or as real as its press clippings), then it is already well beyond the stage where federal tax dollars are needed. It is a commercial reality, or so close that the private sector should be jumping at the business opportunity of a lifetime – the opportunity to capitalize on a discovery of momentous proportions that is relatively uncluttered by government claims to prior knowledge or prior invention.

If on the other hand, CF/LENT is still in that nascent stage where nothing is really clear and where the prospect still exists that all is artifact and anecdote, then there is only one prudent course for practioners to follow -- go back to basics and systematically subject the phenomena to careful examination by the time-tested process of merit-based, peer-review.

I believe, as I have already stated, that I think there are good things to be done in this arena. New ground to be broken. New discoveries to be made. New industries created. But only after the basic science has been illuminated and accepted by the scientific community at large. That is how we, as a nation, have built the greatest scientific establishment in the world. I urge you and your colleagues to accept the challenge. Come forward. Present proposals. Abide by the process.

It will not be easy. Nor will it be guaranteed of success."



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Note that Blue (I) (like the Miller Memo above), also refers to Japan as dropping the funding for cold fusion research.

Chechin et al in Inter. J. of Theoretical Physics and Lindley in vol. 344 of Nature, provide a critical review of numerous theoretical cold fusion models, showing why these cold fusion models are not valid.

As to some specific artisans in the cold fusion field, note that Jones (Surface and Coating Technology – 1992), Jones et al (I) (J. Phys. Chem; 1995), Jones et al (III) (J. Phys. Chem. B, 1998), Droege (I) (Maui Papers #4), show that the alleged positive results of Dr. Miles cannot be relied on as accurate.

Even Miles himself in an article entitled “Cold Fusion Controversy” on pages 10, 11 of C & EN (July 13, 1998) states:

“The cold fusion controversy will continue until an experiment is so clearly defined that it can be readily reproduced in any laboratory. My results, along with the reports from many other laboratories, suggest that there are hidden variables within the palladium metal that are not yet under experimental control. These variables include the grain size and impurity levels.”

Little (I) (21 May 1998), found no evidence of excess heat when attempting to duplicate the alleged positive results of Dr. Case, even with input from Dr. Case. Clarke (II) (Jan. 2003) also found no evidence of He-4 production from DD fusion in Case-type cells. On page 127, Clarke (II) states that on the evidence, systematic error is the likely reason for the alleged observation of He-4 production by Dr. Case and by McKubre et al at SRI. Clarke et al (III) on page 254 state this systematic error may be due to SRI calibrating their mass spectrometer with deuterium gas having approximately 5ppm He-4.

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Kunich shows that laboratories can have local concentrations of helium that can be orders of magnitude above normal background levels.

There have been allegations of excess heat in "boil dry" experiments.

However, the alleged showings of excess heat such as in "boil dry" or "heat after death" experiments such as that of F and P, are of no merit in view of the showings for example, in any of Morrison (III) (Physics Letters A), Morrison (VI) (Cold Fusion Update No. 8), Morrison (VII) (Cold Fusion Update No. 9), Droege (I) (Maui Paper #4), White, Wilson et al.

As to Dr. Arata's alleged positive results, note for example, the negative comments in Murray (VII), Shanahan (I), Shanahan (II), Clarke (I), Clarke (III) and Clarke et al (II). In the second column on page 152, Clarke (III) concludes that Arata et al actually recorded the well-known (to mass spectroscopists) instrumental "memory effect" for He-4 and mistakenly labeled it as a genuine signal of that isotope in the Pd-black samples. Clark (III) states that in this type of "memory", a  $D_2^+$  ion beam is much more effective in releasing imbedded He-4 (from previous samples) from interior sections of the mass spectrometer than an  $H_2^+$  ion beam. Clarke et al (I) end with the telling statement, "To be sure, it is very attractive to consider the prospect of energy produced by "cold fusion"; however, we are not willing to suspend the laws of nature (as the ancient Greeks said it) in order to "save the phenomenon"."

As to Dr. McKubre's alleged positive results, note for example, the negative comments in Shelton et al, Green et al, Shkedi et al, Giglio, Murray (II), Murray (V), Shanahan (III).

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Note particularly, the following quote from McKubre in Murray (II):

"We do not know how to reproduce our own experiments. We have generated more null results and hours of beautiful calorimetric balance (>100, 000h) than anyone on the planet except Fleischmann and Pons. Nevertheless, the existence of a thermal anomaly in the D/Pd system is clear to me, as it is to them because we have seen the effect with our own eyes and modulated it with our own hands. We cannot prove it to you because we are not in control of all critical parameters. You should be skeptical, and remain so until we supply proof". (Underlining added).

Shanahan (III) (dated 2003) refers to problems with the helium measurements by McKubre at SRI, (said problems including significant contamination due to leakage to air). The problems with leakage to air at SRI, are discussed in detail in Clarke et al (III). Giglio shows that if McKubre is actually producing helium, he should also be detecting gamma radiation and, shows that the energy from the alleged nuclear fusion reactions cannot be transferred to the cathode crystal lattice as speculated by some cold fusion advocates.

Shanahan (IV) (Thermochimica Acta (2002)) refers to a systematic error in mass flow calorimetry that can account for the alleged excess power (heat) results in cold fusion experiments. Shanahan (V) (dated 2002) states that the recent Navy report also did not consider this systematic error and so, does not eliminate it is a possible explanation. In this same vein, Shanahan (VI) discusses a report by Szpak, Mosier-Boss, Miles and Fleischmann in which they attempt to reject recombination as the actual cause of their alleged excess heat observations. Shanahan (VI) states that Szpak et al have misunderstood the at-the-electrode, under the electrolyte surface recombination issue and that their prior photographic evidence is in fact, reasonable evidence of this recombination phenomenon.

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Dewey on page 996 of Electronics World and Wireless World states that this hydrogen-oxygen recombination can cause "hot spots" on the cathode. Shanahan (VI) sets forth physical conditions which could produce a calibration constant shift and what might cause those conditions to arise. Note particularly, the "Conclusions" in Shanahan (VI).

The documents relied on above by the examiner, are evidence that one of ordinary skill in this art does not know the parameters of an operative cold nuclear fusion/cold nuclear transformation system which is actually capable of producing nuclear reactions or excess heat, nor, how to determine these parameters and, do not consider such cold nuclear reaction systems to be operative.

This being the case, it is necessary for applicants specification to disclose the requisite parameters for obtaining the particular disclosed and claimed nuclear fusion, net charge densities, electron shielding, etc.; when utilizing applicants particular cold nuclear reaction system.

However, applicants specification is insufficient and non-enabling in failing to set forth said requisite parameters.

In the present case, the examiner has stated above that there is no adequate description nor enabling disclosure of said requisite parameters. Note again that the examiner has presented extensive documentary evidence that those of ordinary skill in this art do not know what specific parameters, are actually necessary to cause the production of nuclear reactions or excess heat in this type of system. See Bank v. Rauland Corp. 64 USPQ 93; In re Corneil et al, 145 USPQ 697.

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Note further that said extensive documentary evidence shows that the scientific community in general considers the alleged positive cold nuclear reaction results to be no more than the result of experimental errors or misinterpretation of experimental data, and not-reproducible.

Again, as set forth above, "reproducibility" must go beyond one's own lab. One must produce a set of instructions, a recipe, that would enable any one in their own independent lab, to produce the same results. If reproducibility only occurs in one's own lab, errors (such as systematic errors or misinterpretation of experimental data) would be suspect.

The present case is considered analogous to that in In re Chilowsky, 134 USPQ 515, wherein the Court held the disclosure to be insufficient. In the present case, the examiner has shown that various necessary parameters have not been provided and, the examiner has provided evidence that the artisan does not know the requisite parameters of an operative cold fusion system, nor how to make an operative cold fusion system.

Note in this respect the Court's statement on page 519 of In re Chilowsky:

"Chilowsky could not start to describe his invention with the assumption that those skilled in the art knew in detail how to build his nuclear reactor. Since it was a major part of what he purported to have invented, it is incumbent on him, under section 112, to tell how to build it, under principles of patent law too elementary to require discussion".

It is apparent from the specification that applicants concept or theory of obtaining an operative cold fusion system, is actually based on the "cold fusion/nuclear reaction" systems that came about from the work of F and P, and it is workable or operative, only if these systems are already operative.

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However, as set forth above, the examiner has presented evidence showing that in such cold fusion systems, the claims of nuclear reactions or excess heat (as well as of other nuclear reaction products), are not reproducible or even obtainable. It consequently must follow that the claims of nuclear reactions or excess heat are not reproducible or even obtainable with applicants invention. While applicant may have set forth theoretical concepts, it is well known in the cold fusion/nuclear reaction field that theory and reality have a habit of not coinciding. There is no evidence to indicate applicant has so succeeded where others have failed, in arriving at an operative cold nuclear reaction system, i.e. that he has progressed his system beyond the point of an unproven theory or concept which still requires an undue amount of experimentation to enable the artisan to make and use the inventive system for its indicated purpose. This view is also considered supported by the failure to set forth a full example of the specific parameters of an operative embodiment. One cannot rely on the skill in the art for the selection of the proper quantitative values to present an operative cold fusion system, since those in the art do not know what these values would be. See Bank v. Rauland Corp., 64 U.S.P.Q 93; In re Corneil et al, 145 U.S.Q. 697.

It is thus considered that the examiner (for the reasons set forth above) has set forth a reasonable and sufficient basis for challenging the adequacy of the disclosure. The statute requires the application itself to inform, not to direct others to find out for themselves; In re Gardener et al, 166 USPQ 138, In re Scarbrough, 183 USPQ 298. Note that the disclosure must enable a person skilled in the art, to practice the invention without having to design structure, not shown to be

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readily available in the art; In re Hirsch, 131 USPQ 198.

To comply with the enablement requirement of the first paragraph of 35 USC 112, a disclosure must adequately present the claimed invention so that an artisan could practice it without undue experimentation. In determining whether any given disclosure would require undue experimentation to make and use the claimed subject matter, consideration must be given to such factors as the relative skill of those in the art, the state of the prior art, the nature of the invention, the presence or absence of a working example, the amount of direction or guidance presented, the predictability or unpredictability of the art, and the quantity of experimentation necessary. Ex parte Forman 230 USPQ 546, 547. Note that the examiner has taken each of these factors into consideration and, based on the extensive documentation set forth above, does not consider applicants disclosure as complying with the enablement requirement of 35 USC 112, first paragraph.

Additionally, it is noted that there has been a published Board decision involving "cold fusion":

See Ex parte Dash, 27 USPQ 2d 1481, wherein it was held that the examiner did not err in rejecting claims for "cold fusion" of nuclear energy for lack of enablement under 35 U.S.C. 112 and as inoperative and lacking utility under 35 U.S.C. 101, since evidence demonstrating that neither excess heat nor traditional nuclear by products of fusion reaction have been detected by careful researchers conducting experiments under conditions that are highly analogous to applicant's electrolytic cell, and demonstrating relative ease with which erroneous results can be achieved by failing to observe strict experiment design controls shifted burden of proof to applicants, and applicants failed to produce any evidence to overcome examiner's position.

There has also been a decision by the U.S. Court of Appeals Federal Circuit on an application involving "cold fusion".

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See In re Swartz, 56 USPQ2d 1703 wherein it was held:

Claims in application that fails to meet utility requirement because invention is inoperative will also fail to meet enablement requirement because person skilled in art cannot practice invention, since application, in order to satisfy enablement of 35 U.S.C §112, must adequately disclose claimed invention so as to enable person skilled in art to practice invention at time of filing without undue experimentation, and since utility requirement of § 101 mandates that invention be operable to achieve useful results.

U.S. Patent and Trademark Office properly rejected application claims directed to "cold fusion" process for lack of utility and enablement, since PTO provided substantial evidence that those skilled in art would reasonably doubt asserted utility of claimed invention, and found that applicant had not submitted evidence that concept of invention could have been practiced by person of ordinary skill without undue experimentation, and since applicant's conclusory allegations that PTO's decision on utility issue is not supported by substantial evidence, or that its conclusion of lack of enablement is incorrect as matter of law.

For a more recent decision by the U.S. Court of Appeals for the Federal Circuit on an application involving "cold fusion", see In re Dash et al, Decided: December 10, 2004, wherein it was stated:

As explained below, we construe the claims at issue to require the production of excess heat energy and to be directed to a method of achieving cold fusion. After that, we turn to the issues of utility and enablement, which here collapse into a single issue. See In re Brana, 51 F.3d 1550, 1564 (Fed. Cir. 1995) ("Obviously, if a claimed invention does not have utility, the specification cannot enable one to use it."). Given the scientific community's considerable doubt regarding the utility of "cold fusion" processes, we hold that the examiner established a prima facie case of lack of utility and enablement. Accordingly, the burden was shifted to Dash, and we hold that substantial evidence supports the Board's finding that Dash failed to meet that burden.

..... Dash's evidence that his invention achieved cold fusion likewise does not convince us that he rebutted the examiner's prima facie case of inoperability. Dash produced evidence regarding detection of tritium, transmutation of palladium, and physical transformation of the cathode, as well as corroborating experiments and calculations designed to show excess heat. For each type of evidence Dash produced, the examiner found at least one sound reason to disbelieve the evidence in either the literature that supported the prima facie case or in Dash's evidence itself. The Board affirmed the examiner's findings. The evidence cited by the examiner constitutes substantial evidence in support of the



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Board's decision. Accordingly, we hold that the Board acted reasonably in concluding that Dash did not make a showing sufficient to rebut the prima facie case of inoperability established by the examiner.

The Patent Office establishes a prima facie case of lack of utility by "showing that one of ordinary skill in the art would reasonably doubt the asserted utility [.]" *Brana*, 51 F.3d at 1566. Because the determination of whether an invention is operative is a question of fact, we review the Board's decision on this issue for substantial evidence. Dash argues that the evidence that supported the examiner's prima facie case is invalid because it does not concern the invention as claimed and because the documents cited are anecdotal or not peer-reviewed. However, we are aware of no rule that forbids the examiner from relying on related technology, anecdotal information, or sources that are not peer-reviewed to establish a case of inoperability. These details merely go to the weight of the evidence, not whether it can be relied upon at all. Thus, we understand Dash's arguments as attacks on the weight the Board accorded to the cited information.

Substantial evidence supported the Board's finding that the examiner established a prima facie case of inoperability. While it may be ideal for the examiner to offer peer-reviewed data on precisely the claimed invention to establish such a case, such extreme certainty is not required. The examiner must only establish that a person of ordinary skill in the art would reasonably doubt the asserted utility. *Brana*, 51 F.3d at 1566. It was reasonable for the Board to conclude that the examiner has established such doubt based on the number and quality of cited references that debunked claims of cold fusion.

It is also noted that there has apparently been a court decision on cold fusion in Italy (e.g. see *Italy-Cold Fusion & Judges's Verdict*).

6. Claims 1-10, 13, 14, 89, 91-95 are rejected under 35 U.S.C. 112, first paragraph, for the reasons set forth in the objection to the specification, in section 5 above.

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 1-10, 13, 14, 89, 91-95 are rejected under 35 U.S.C. 101 because the invention as disclosed is inoperative and therefore lacks utility.

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The reasons that the invention as disclosed is operative are the same as the reasons set forth in section 5 above as to why the specification is objected to and the reasons set forth in said section 5 above are accordingly incorporated herein.

Applicant's claimed invention is directed to a system for producing nuclear fusion and, nuclear fusion is thus considered as being applicant's specific utility.

The statute requires that an asserted utility be specific, not general. Note MPEP 2107.01 (II)A which states:

The statute requires that an asserted utility be specific, not general. Note MPEP 2107.01(II)A which states:

"A statement of specific utility should fully and clearly explain why the applicant believes the invention is useful. Such statements will usually explain the purpose of or how the invention may be used (e.g. a compound is believed to be useful in the treatment of a particular disorder). Regardless of the form of statement of specific utility, it must enable one ordinarily skilled in the art to understand why the applicant believe the claimed invention is useful."

As set forth in MPEP 2107 (IV) a deficiency under 35 USC 101 also creates a deficiency under 35USC 112 first paragraph, citing In re Brang, 35 USPQ2d 1436.

As set forth in section 5 above, there is no reputable evidence of record to indicate the invention has been reduced to the point of providing in current available form, an operative cold fusion system. The invention is not considered as meeting the requirements of 35 U.S.C. 101 as being "useful". Note in this respect, page 89 of Huizenga (I). Said page 89 reproduces the conclusion of the 1989 final report of the DOE/ERAB panel on cold fusion. Conclusion (I) states

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that there is no "convincing evidence that useful sources of energy will result from the phenomena attributed to cold fusion".

Now, even after 15 years of cold fusion research and according to one estimate by Review #14, an expenditure of more than 60 million dollars, the Dec. 1, 2004 final report of the DOE panel on cold fusion still has a similar conclusion.

Note the following quote from the Dec. 1, 2004 "Report of The Review of Low Energy Nuclear Reactions" under the heading "Conclusion":

"While significant progress has been made in the sophistication of calorimeters since the review of this subject in 1989, the conclusions reached by the reviewers today are similar to those found in the 1989 review."

Applicant at best, has set forth what may be considered a concept or an object of scientific research. However, it has been held that such does not present a utility within the meaning of 35 U.S.C. 101. See Brenner v. Manson, 148 U.S.P.Q. 689.

Additionally, it is well established that where as here, the utility of the claimed invention is based upon allegations that border on the incredible or allegations that would not be readily accepted by a substantial portion of the scientific community (note the documents relied on by the examiner in section 5 above), sufficient substantiating evidence of operability must be submitted by applicant. Note In re Houghton, 167 USPQ 687 (CCPA 1970); In re Ferens, 163 USPQ 609 (CCPA 1969); Puharich v. Brenner, 162 UPSQ 136 (CADA 1969); In re Pottier, 152 USPQ 407 (CCPA 1967); In re Ruskin, 148 USPQ 221 (CCPA 1996); In re Citron, 139 USPQ 516 (CCPA 1963); and In re Novak, 134 USPQ 335 (CCPA 1962).

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9. Claims 1-10, 13, 14, 89, 91-95 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are directed to an apparatus, but appear to be mostly directed toward a desired manner of operation of said apparatus. Note that the inclusion in a claim of both an apparatus and the method steps of using the apparatus, renders the claims indefinite. See MPEP 2173.05 (p)(II) and Ex parte Lyell, 17 USPQ 2d 1548.

At present, the apparatus claims do not provide proper antecedent basis for all terms present, e.g. the ions, lattice interstices, electron source, etc.

Terms such as "proximal", "requisite", "promotes", "an affinity", "sufficient", "to facilitate", "geometrically-enhanced", "proximate", "sharply-pointed", "proximity", "to promote", etc., are relative, they can be given no definite meaning and according they render the claims vague and indefinite and the metes and bounds thereof are undefined.

The claims are vague, indefinite and incomplete as to what all is meant by and is encompassed by such terms as "geometrically-enhanced shape", "an electrically neutral plane", etc.

Claims such as claim 92 are vague, indefinite and incomplete as to how and in what manner, one can have an "electrical potential difference" without a means to provide such.

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Claim 92 is further vague, indefinite and incomplete as to how and in what manner, the "plane" can be electrically neutral, since it has an electrical potential applied to it.

Claims such as claim 3, claim 4, etc., recite "wherein" clauses, the content of which does not inherently result from the actual structure recited. Thus, there is an issue as to the limiting effect (if any) of the "wherein" clauses on the claim language and, said "wherein" clauses accordingly render the claims vague, indefinite and incomplete and, the metes and bounds of the claims are not properly nor adequately defined (Note the references to "wherein" clauses in MPEP 2106 under the heading "C. Review the Claims" in section II).

As set forth in section 5 above, the examiner has cited documents (e.g. Gullett, Oswin et al, Kuo et al, Wicke et al, and Andrus (II)) which illustrate applicants actual claimed structure (including the dendritic-type structure). These documents however, do not disclose that they are operable to produce nuclear fusion. Assuming for the sake of argument that none of these documents are actually capable of producing nuclear fusion, applicants claims are incomplete in failing to recited the additional structures and/or method steps (not found in any of said references) which is actually necessary to produce the indicated nuclear fusion.

10. Claims 1-10, 13, 14, 89, 91-95 are rejected under 35 USC 101 as they are directed to neither a process nor a machine but rather, embrace or overlap two separate statutory classes of invention set forth in 35 USC 101 which is drafted

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to set forth statutory classes of invention in the alternative only. See MPEP 2173.05 (p)(II).

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1-10, 13, 89, 91-95 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by any of Sawatimova et al, Rice et al, Oriani et al, Haeffner or Kim et al.

The references each show applicants actual claimed structure including a nuclear fusion system having a reacting surface with protuberances, i.e. whiskers, dendrites or asperities, thereon.

Applicants claims are replete with statements of intended or desired use. While the systems of any of the references are considered inherently capable of operating in the manner set forth in the claims, it is well settled case law that statements as to possible future acts or to what may happen in a method of

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operation, do not serve to patentably distinguish the claimed structure over that of the reference. See In re Pearson, 181 USPQ 641; In re Yanush, 177 USPQ 705; In re Finsterwalder, 168 USPQ 530; In re Casey, 152 USPQ 235; In re Otto, 136 USPQ 458; Ex parte Masham, 2 USPQ 2nd 1647.

See MPEP 2114 which states:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647.

Claims directed to apparatus must be distinguish from the prior art in terms of structure rather than functions. In re Danly, 120 USPQ 528, 531.

Apparatus claims cover what a device is, not what a device does. Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1528.

As to limitations which are considered to be inherent in a reference, note the case law of In re Ludtke, 169 USPQ 563; In re Swinehart, 169 USPQ 226, In re Fitzgerald, 205 USPQ 594, In re Best et al, 195 USPQ 430, and In re Brown, 173 USPQ 685, 688.

Additionally, as set forth in MPEP 2115, a recitation in a claim to the material or article worked upon, does not serve to limit an apparatus claim.

As to terms such as the term "electrically neutral plane", the term "plane" itself is not structure and there are numerous imaginary planes in any of the references, which would inherently be "electrically neutral".

Further, applicants claims are to the apparatus per se, such as an apparatus sitting on a shelf, with no power supply turned on, in which case, everything is electrically neutral and applicants claims do not define over such.

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Additionally, note that references such as Kim et al refer to an insulator layer (which would inherently be electrically neutral).

While the "ions of atomic elements..." recited in claim 13 is the material being worked upon and hence is not given patentable weight as per MPEP 2115, such reads on the presence of any ions which are not hydrogen isotopes (such as oxygen).

Note also page 3 of Kim et al which refers to nuclear reactions involving elements of higher atomic number than hydrogen.

13. Claims 1, 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Andrus (II).

Andrus (II) shows the actual structure recited in the claims. The reference is inherently capable of being operated in the manner set forth in the claims. See also, the discussion in section 12 above concerning statements of intended or desired use, and MPEP 2114.

14. The other references cited further illustrate systems with protuberances on the electrodes.


15. Any inquiry concerning this communication should be directed to Harvey E. Behrend at telephone number (571) 272-6871. The examiner can normally be reached Tuesday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 571-272-6973. The fax phone number for the organization where this application or proceeding is assigned is 571-272-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**HARVEY BEHREND  
PRIMARY EXAMINER**

Behrend/vs  
July 12, 2005